

CLAIMS

We claim:

1 1. An apparatus for wrapping a napkin around one or more
2 utensils, comprising:

3 a generally rectangular hollow housing having, an output
4 opening disposed on said housing, a utensil input and a napkin
5 input;

6 a support frame, positioned inside of said housing, having
7 an assembly of vertically oriented beams and horizontally
8 oriented support rails;

9 a napkin lifting station for receiving and supporting a
10 stack of napkins, the napkins being placed onto said lifting
11 station through said napkin input;

12 a napkin wrapping station having a plurality of conveyor
13 belts for wrapping a napkin around a predetermined amount of
14 utensils;

15 a napkin transfer station for individually transferring
16 napkins from said napkin lifting station to said napkin wrapping
17 station;

18 a utensil transfer station for simultaneously placing a
19 plurality of utensils onto an individual napkin while the napkin
20 is positioned on the napkin wrapping station; and

21 a napkin folding station for folding over corners of a
22 napkin prior to being wrapped by said wrapping station;

23 whereby said napkin lifting station, napkin wrapping
24 station, napkin transfer station, napkin folding station and
25 utensil transfer station are each disposed on said support
26 frame;

27 whereby a predetermined amount of utensils are
28 automatically wrapped in a napkin for use as a place setting
29 without the need of human contact.

1 2. The apparatus according to claim 1 wherein said napkin
2 lifting station comprises:

3 a platform having a flat top surface;

4 a plurality of platform supports; and

5 a platform lift for incrementally lifting said platform
6 after a predetermined number of napkins are removed from the
7 napkin lifting station.

1 3. The apparatus according to claim 1 wherein said napkin
2 wrapping station comprises:

3 a pair of sidewalls;

4 a horizontally oriented, elongated output conveyor belt
5 disposed between the pair of sidewalls;

6 a pair of counter-rotating napkin wrapping belts;

7 a wrapping carriage having a plurality of winding rollers;

8 a wrapping carriage shifter assembly; and

9 a plurality of actuators for powering said napkin wrapping
10 station.

1 4. The apparatus according to claim 1 wherein said napkin
2 transfer station comprises:

3 a base plate having a flat bottom surface and an area
4 generally equivalent to the size of a napkin;

5 a plurality of suction devices, for releasably engaging the
6 napkins, disposed along the bottom surface of the base plate;
7 a height adapter for raising and lowering said base plate;
8 a pair of guide rails; and
9 a shifter assembly for repositioning said base plate along
10 the guide rails.

1 5. The apparatus according to claim 1 wherein said utensil
2 transfer station comprises:

3 a plurality of cartridges for sortingly storing stacks of a
4 plurality of types of utensils;

5 a plurality of lifters for lifting each of the stacks of
6 utensils;

7 a plurality of utensils grippers for removing individual
8 utensils from the cartridges;

9 a shifter assembly for lifting and transporting the
10 utensils from the cartridges to the napkin; and

11 a bracket for mounting the said utensil transfer station to
12 said support frame.

1 6. The apparatus according to claim 5 wherein said utensil
2 transfer station further comprises a feed conveyor belt for

3 receiving the utensils from the utensil grippers and
4 subsequently transporting the utensils to the napkins.

1 7. The apparatus according to claim 5 wherein each of said
2 cartridges contains a different type of utensil and the number
3 of cartridges used may vary depending on the number of different
4 utensils used.

1 8. The apparatus according to claim 5 wherein said utensil
2 grippers comprise a pneumatic gripper having a pair of fingers
3 for releasably engaging the sides of the utensils.

1 9. The apparatus according to claim 1 wherein said napkin
2 folding station comprises:

3 a folding arm having at least one suction device disposed
4 on its bottom surface for releasably engaging the napkin;

5 a vacuum lift for raising and lowering the folding arm; and

6 a shifter assembly for allowing the folding arm to
7 manipulate the napkin.

1 10. The apparatus according to claim 3 wherein said output
2 opening is aligned with said output conveyor belt so that the
3 wrapped utensils will exit out of the apparatus along said
4 output conveyor belt and through said output opening.

1 11. The apparatus according to claim 5 wherein said
2 utensil input comprises a door disposed on said housing and
3 allows the utensils to be placed in said cartridges of said
4 utensil transfer station.

1 12. The apparatus according to claim 2 wherein said napkin
2 input comprises a door disposed on said housing and aligned with
3 said napkin lifting station to allow the napkins to be placed on
4 said napkin lifting station.

1 13. An apparatus for wrapping a napkin around one or more
2 utensils comprising:

3 a generally rectangular shaped, hollow housing having an
4 output opening, a utensil input access door and a napkin input
5 access door;

6 a support frame, positioned inside of said housing, having
7 an assembly of vertically disposed beams and horizontally
8 disposed support rails;

9 a napkin lifting station for receiving and supporting a
10 stack of napkins, the napkins being placed onto said lifting
11 station through said napkin input access door, said lifting
12 station having a platform, with a flat top, a plurality of
13 supports and a platform lift for incrementally lifting said

14 platform after a predetermined amount of napkins are removed
15 from the stack;

16 a napkin wrapping station for wrapping a napkin around a
17 predetermined amount of utensils, having a pair of sidewalls, an
18 output conveyor belt disposed between said pair of sidewalls, a
19 pair of counter-rotating napkin wrapping belts, a wrapping
20 carriage having a plurality of winding rollers, a wrapping
21 carriage shifter assembly and a plurality of actuators for
22 operating said napkin wrapping station;

23 a napkin transfer station for individually transferring
24 napkins from said napkin lifting station to said napkin wrapping
25 station, having a base plate with a flat bottom surface, a
26 plurality of suction devices disposed on the bottom surface of
27 the base plate, a height adapter for raising and lowering the
28 base plate, a pair of guide rails and a shifter assembly for
29 repositioning the base plate along the guide rails;

30 a utensil transfer station for simultaneously placing a
31 plurality of types of utensils onto an individual napkin while
32 the napkin is positioned on said napkin wrapping station, said
33 utensil transfer station having a plurality of cartridges for
34 sortingly storing a plurality of types of utensils, a plurality
35 of lifters for lifting each of the stacks of utensil out of the
36 cartridges, a plurality of utensils grippers for removing
37 individual utensils from the cartridges, a utensil shifter

38 assembly for lifting and transporting the utensils onto the
39 napkins and a bracket for mounting said utensil transfer station
40 to said support frame; and

41 a napkin folding station for folding over corners of a
42 napkin prior to being wrapped by said wrapping station, having
43 a folding arm with a suction device disposed on its bottom
44 surface for releasably engaging the napkin and a shifting
45 assembly for allowing the folding arm to manipulate the napkin;

46 whereby said napkin lifting station, napkin wrapping
47 station, napkin transfer station, napkin folding station and
48 utensil transfer station are each disposed on said support
49 frame;

50 whereby a predetermined amount of utensils are
51 automatically wrapped in a napkin for use as a place setting
52 without the need of human contact.

1 14. A method of wrapping a napkin around one or more
2 utensils, said method comprising the steps of:

3 positioning a stack of napkins on a napkin lifting station;

4 individually transferring napkins from said lifting station
5 to a napkin wrapping station;

6 transferring a plurality of utensils from a plurality of
7 utensil storage cartridges to said napkin wrapping station and
8 positioning the utensils on the napkin;
9 folding two opposing corners of the napkin over itself; and
10 wrapping the napkin around the utensils.

1 15. The method according to claim 14 wherein said napkin
2 transfer step includes releasably engaging the napkins
3 individually with a napkin transfer plate having a plurality of
4 suction devices disposed on its bottom surface and then lifting
5 and carrying each napkin to said napkin wrapping station.

1 16. The method according to claim 14 wherein said utensils
2 transfer step includes gripping an individual utensil from each
3 of said utensil storage cartridges and transporting them to a
4 utensil feeding conveyor belt that transfers the utensils onto a
5 napkin positioned on the napkin wrapping station.

1 17. The method according to claim 14 wherein said wrapping
2 step includes placing the napkin across a gap between adjacent,
3 counter-rotating wrapping belts that feed the napkin onto a pair
4 of winding rollers that roll the napkin around the utensils and
5 then once the napkin is rolled, lowering the winding rollers so

6 the napkin falls onto an exit conveyor and exits said napkin
7 wrapping station.

1 18. The method according to claim 17, further including
2 the step of transporting the wrapped napkins along said exit
3 conveyor through an output opening.